

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA7 | Colne Valley

Data appendix (LQ-001-007)

Land quality

November 2013

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA7 | Colne Valley

Data appendix (LQ-001-007)

Land quality

November 2013



Department
for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

A report prepared for High Speed Two (HS2) Limited.

High Speed Two (HS2) Limited,
Eland House,
Bressenden Place,
London SW1E 5DU

Details of how to obtain further copies are available from HS2 Ltd.

Telephone: 020 7944 4908

General email enquiries: HS2enquiries@hs2.org.uk

Website: www.hs2.org.uk

High Speed Two (HS2) Limited has actively considered the needs of blind and partially sighted people in accessing this document. The text will be made available in full on the HS2 website. The text may be freely downloaded and translated by individuals or organisations for conversion into other accessible formats. If you have other needs in this regard please contact High Speed Two (HS2) Limited.



Printed in Great Britain on paper
containing at least 75% recycled fibre.

Contents

1	Introduction	1
2	Engagement	2
3	Detailed risk assessment	4
3.1	Baseline risk assessment	6
3.2	Construction risk assessment	20
3.3	Post-construction risk assessment	35
3.4	Assessment of temporary (construction) and permanent (post-construction) effects	49
4	Inspections notes and other site data	61
5	Geological sites of special scientific interest and local geological sites	62
6	Mining and minerals data	63
7	References	65

List of tables

Table 1: Engagement on land quality issues undertaken for the Colne Valley study area	2
Table 2: Sites included in the detailed risk assessment within the study area	4
Table 3: Baseline CSM and qualitative risk assessment – existing Marylebone to Aylesbury line (Area ref 7-1)	6
Table 4: Baseline CSM and qualitative risk assessment – oil depot (Area ref 7-2)	7
Table 5: Baseline CSM and qualitative risk assessment – historical infilled gravel pit (part of Dew's Dell SINC) (Area ref 7-7)	9
Table 6: Baseline CSM and qualitative risk assessment – Denham Media Park and Broadwater Park Industrial Estate (Area ref 7-9)	10
Table 7: Baseline CSM and qualitative risk assessment – former sewage works (Area ref 7-11)	11
Table 8: Baseline CSM and qualitative risk assessment – disused sand, gravel and chalk pit (Area ref 7-16)	12
Table 9: Baseline CSM and qualitative risk assessment – disused sand, gravel and chalk pit (Area ref 7-17)	12
Table 10: Baseline CSM and qualitative risk assessment – disused chalk pit and historical Pynesfield Farm Landfill (Area ref 7-18)	13
Table 11: Baseline CSM and qualitative risk assessment – disused chalk pits and historical landfill (Area ref 7-19)	13
Table 12: Baseline CSM and qualitative risk assessment – Pynesfield Farm/Maple Cross Landfill (Area ref 7-20)	14
Table 13: Baseline CSM and qualitative risk assessment – West Hyde House Landfill (Area ref 7-26)	14
Table 14: Baseline CSM and qualitative risk assessment – Dew's Farm historical landfill (Area ref 7-28)	15
Table 15: Baseline CSM and qualitative risk assessment – Harefield Marina Landfill (Area ref 7-31)	17
Table 16: Baseline CSM and qualitative risk assessment – Pynesfield Farm Landfill (Area ref 7-32)	18
Table 17: Baseline CSM and qualitative risk assessment – New Years Green historical landfill (Area ref 7-33)	18
Table 18: Construction CSM and qualitative risk assessment – existing Marylebone to Aylesbury line (Area ref 7-1)	20
Table 19: Construction CSM and qualitative risk assessment – oil depot (Area ref 7-2)	21
Table 20: Construction CSM and qualitative risk assessment – historical infilled gravel pit (part of Dew's Dell SINC) (Area ref 7-7)	23
Table 21: Construction CSM and qualitative risk assessment – Denham Media Park and Broadwater Park Industrial Estate (Area ref 7-9)	25
Table 22: Construction CSM and qualitative risk assessment – former sewage works (Area ref 7-11)	26
Table 23: Construction CSM and qualitative risk assessment – disused sand, gravel and chalk pit (Area ref 7-16)	27
Table 24: Construction CSM and qualitative risk assessment – disused sand, gravel and chalk pit (Area ref 7-17)	27
Table 25: Construction CSM and qualitative risk assessment – disused chalk pits and historical Pynesfield Farm Landfill (Area ref 7-18)	27
Table 26: Construction CSM and qualitative risk assessment – disused chalk pits and historical landfill (Area ref 7-19)	28
Table 27: Construction CSM and qualitative risk assessment – Pynesfield Farm/Maple Cross Landfill (Area ref 7-20)	29

Table 28: Construction Baseline CSM and qualitative risk assessment – West Hyde House Landfill (Area ref 7-26)	29
Table 29: Construction CSM and qualitative risk assessment – Dew’s Farm historical landfill (Area ref 7-28)	30
Table 30: Construction CSM and qualitative risk assessment – Harefield Marina Landfill (Area ref 7-31)	32
Table 31: Construction CSM and qualitative risk assessment – Pynesfield Farm Landfill (Area ref 7-32)	33
Table 32: Construction CSM and qualitative risk assessment – New Years Green historical landfill (Area ref 7-33)	33
Table 33: Post-Construction CSM and qualitative risk assessment – existing Marylebone to Aylesbury line (Area ref 7-1)	35
Table 34: Post Construction CSM and qualitative risk assessment – oil depot (Area ref 7-2)	36
Table 35: Post Construction CSM and qualitative risk assessment – historical infilled gravel pit (part of Dew’s Dell SINC) (Area ref 7-7)	38
Table 36: Post Construction CSM and qualitative risk assessment – Denham Media Park and Broadwater Park Industrial Estate (Area ref 7-9)	39
Table 37: Post Construction CSM and qualitative risk assessment – former sewage works (Area ref 7-11)	41
Table 38: Post Construction CSM and qualitative risk assessment – disused sand, gravel and chalk pit (Area ref 7-16)	41
Table 39: Post Construction CSM and qualitative risk assessment – disused sand, gravel and chalk pit (Area ref 7-17)	42
Table 40: Post Construction CSM and qualitative risk assessment – disused chalk pits and historical Pynesfield Farm Landfill (Area ref 7-18)	42
Table 41: Post Construction CSM and qualitative risk assessment – disused chalk pits and historical landfill (Area ref 7-19)	43
Table 42: Post Construction CSM and qualitative risk assessment – Pynesfield Farm/Maple Cross Landfill (Area ref 7-20)	43
Table 43: Post Construction Baseline CSM and qualitative risk assessment – West Hyde House Landfill (Area ref 7-26)	44
Table 44: Post Construction CSM and qualitative risk assessment – Dew’s Farm historical landfill (Area ref 7-28)	45
Table 45: Post Construction CSM and qualitative risk assessment – Harefield Marina Landfill (Area ref 7-31)	46
Table 46: Post Construction CSM and qualitative risk assessment – Pynesfield Farm Landfill (Area ref 7-32)	47
Table 47: Post Construction CSM and qualitative risk assessment – New Years Green historical landfill (Area ref 7-33)	47
Table 48: Significance of impact during construction and post construction – existing Marylebone to Aylesbury line (Area ref 7-1)	49
Table 49: Significance of impact during construction and post construction – oil depot (Area ref 7-2)	50
Table 50: Significance of impact during construction and post construction – historical infilled gravel pit (part of Dew’s Dell SINC) (Area ref 7-7)	52
Table 51: Significance of impact during construction and post construction – Denham Media Park and Broadwater Park Industrial Estate (Area ref 7-9)	53

Table 52: Significance of impact during construction and post construction – former sewage works (Area ref 7-11)	54
Table 53: Significance of impact during construction and post construction – disused sand, gravel and chalk pit (Area ref 7-16)	55
Table 54: Significance of impact during construction and post construction – disused sand, gravel and chalk pit (Area ref 7-17)	55
Table 55: Significance of impact during construction and post construction – disused chalk pits and historical Pynesfield Farm Landfill (Area ref 7-18)	55
Table 56: Significance of impact during construction and post construction – disused chalk pits and historical landfill (Area ref 7-19)	56
Table 57: Significance of impact during construction and post construction – Pynesfield Farm/Maple Cross Landfill (Area ref 7-20)	56
Table 58: Significance of impact during construction and post construction – West Hyde House Landfill (Area ref 7-26)	56
Table 59: Significance of impact during construction and post construction – Dew’s Farm historical landfill (Area ref 7-28)	57
Table 60: Significance of impact during construction and post construction – Harefield Marina Landfill (Area ref 7-31)	58
Table 61: Significance of impact during construction and post construction – Pynesfield Farm Landfill (Area ref 7-32)	59
Table 62: Significance of impact during construction and post construction – New Years Green historical landfill (Area ref 7-33)	59
Table 63: Summary Mineral Planning within the Colne Valley area	63

1 Introduction

1.1.1 The land quality appendix for the Colne Valley community forum area (CFA7) comprises:

- a summary of engagement undertaken (Section 2);
- detailed risk assessment (Section 3);
- inspection notes and other site data (Section 4);
- geological sites of special scientific interest (SSSI) and local geological sites (LGS) (Section 5); and
- mining and minerals data (Section 6).

1.1.2 Maps referred to throughout the land quality appendix are contained in Maps LQ-01-011 to LQ-01-013 Volume 5, Land Quality Map Book.

2 Engagement

- 2.1.1.1 Table 1 sets out the local authorities and other organisations that have been engaged with during the preparation of the land quality section of the environmental impact assessment (EIA) for this study area, the types of information that have been provided to the assessment team and any specific concerns of those with whom the team engaged.

Table 1: Engagement on land quality issues undertaken for the Colne Valley study area

Local authority or other organisation	Method/dates of contact	Information provided and/or specific concerns
Buckinghamshire County Council (BuCC)	Contact via email on: 28 November 2012; 3 December 2012; 21 December 2012; 2 January 2013; 23 January 2013; 1 February 2013; 9 February 2013; and 2 May 2013.	Initial email regarding detailed mineral areas for assessing sterilisation of resources and requesting landfill data to provide more detail on what has already been received to assess contamination potential. BuCC responded with the data requested regarding minerals and waste sites, as well as links to the minerals safeguarding area (MSA) on the BuCC website. BuCC also supplied geographical information systems (GIS) data showing MSA, preferred areas and landfill data and confirmed it does not have a designated petroleum officer or hold any information on underground storage tanks (UST).
Chiltern District Council (ChDC)	Contact via email on: 28 November 2012; 24 January 2013; 4 February 2013; 29 February 2013; and 10 May 2013. Contact via telephone on: 2 May 2013.	ChDC supplied requested information regarding sites that have potential land contamination, including GIS data and Part IIA ¹ sites and are in the vicinity of the Proposed Scheme; information regarding UST on Hyde Heath Road was also provided.
Hertfordshire County Council (HCC)	Contact via email on: 25 October 2012; 7 November 2012; 3 January 2013; 21 January 2013; and 21 February 2013.	HCC responded with the requested data listing minerals planning permissions located in the area of interest in mapping format data (shapefiles). HCC supplied the requested GIS data for mineral safeguarding sites.
South Buckinghamshire District	Contact via email on:	SBDC supplied requested information regarding

¹ *Environmental Protection Act 1990, Part IIA*, London, Her Majesty's Stationary Office.

Local authority or other organisation	Method/dates of contact	Information provided and/or specific concerns
Council (SBDC)	28 November 2012; 5 December; and 11 December.	contaminated land sites.
Three Rivers District Council (TRDC)	Contact via email on: 3 October 2012.	TRDC supplied requested information on potentially contaminated land, providing an image of landfills in the area using data from TRDC database and confirmed that no Part IIA sites are present in the district.
Environment Agency	Contact via email on: 24 April 2013; 15 May 2013; 24 May 2013; 12 June 2013; 14 June 2013; 27 June 2013; and 8 July 2013.	The Environment Agency has been contacted to supply information on landfills within the study area - data outstanding at the time of production of this report.

3 Detailed risk assessment

3.1.1 This appendix presents assessments for areas potentially posing a contaminative risk for the Proposed Scheme within the study area. For each site the following data are presented:

- baseline risk assessment;
- construction risk assessment;
- post-construction risk assessment; and
- assessment of temporary (construction) and permanent (post-construction) effects.

3.1.2 This risk assessment incorporates the following assumptions:

- construction workers are not included as part of this assessment;
- sites that have been assessed as potentially posing a contaminative risk to the Proposed Scheme have been grouped and considered together where appropriate. It should be noted that some parcels of land may have had several land uses from different epochs;
- during construction standard mitigation procedures will be in place in accordance with the draft Code of Construction Practice (CoCP) (Volume 5: Appendix CT-003-000); and
- during the post-construction condition it is assumed that all required remediation has been undertaken and carried out.

3.1.3 The sites assessed in this study area are shown on the Maps LQ-01-011 to LQ-01-013 (Volume 5, Land Quality Map Book).

Table 2: Sites included in the detailed risk assessment within the study area

Area reference	Area name	Table numbers
7-1	Existing Marylebone to Aylesbury line	3, 18, 33, 48
7-2	Oil depot	4, 19, 34, 49
7-7	Historical infilled gravel pit	5, 20, 35, 50
7-9	Denham Media Park and Broadwater Park Industrial Estate	6, 21, 36, 51
7-11	Former sewage works	7, 22, 37, 52
7-16	Disused sand, gravel and chalk pit	8, 23, 38, 53
7-17	Disused sand, gravel and chalk pit	9, 24, 39, 54
7-18	Disused chalk pit and historical landfill	10, 25, 40, 55
7-19	Disused chalk pit and historical landfill	11, 26, 41, 56
7-20	Pynesfield Farm/Maple Cross landfill	12, 27, 42, 57

Area reference	Area name	Table numbers
7-26	West Hyde House landfill	13, 28, 43, 58
7-28	Dew's Farm historical landfill	14, 29, 44, 59
7-31	Harefield Marina landfill	15, 30, 45, 60
7-32	Pynesfield Farm landfill	16, 31, 46, 61
7-33	New Years Green historical landfill	17, 32, 47, 62

3.1.4 Contaminant types included within the risk assessments are based on the Priority Contaminants Report CLR 8². Although withdrawn, this document is still commonly used and is considered good practice.

3.1.5 The remainder of this section presents the risk assessment for the sites set out in Table 2. The following acronyms are used in these tables:

- CSM - conceptual site model;
- SINC - site of importance for nature conservation;
- SSSI - site of special scientific interest; and
- VOC - volatile organic compounds.

² Defra and Environment Agency, (2002), *Potential contaminants for the assessment of land- R&D Publication*, Bristol, Environment Agency.

3.1 Baseline risk assessment

Table 3: Baseline CSM and qualitative risk assessment – existing Marylebone to Aylesbury line (Area ref 7-1)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Residual contamination in made ground (e.g. ballast) including heavy metals, oils and asbestos. Low levels of ground gas (methane, carbon dioxide and VOC) in areas of potential landfilling	Sensitive land use Adjacent to commercial/industrial facilities (agricultural research facility, skip hire, pre-mix cement manufacturer, construction material recycling centre) Commercial/industrial facilities within 50m (oil depot)	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Unlikely	Moderate	Low
		Inhalation of vapours derived from contaminated groundwater/soil	Unlikely	Moderate	Low
		Exposure to asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	Controlled waters Secondary A alluvium and Lambeth Group at surface	Vertical and lateral migration of contaminated groundwater through culverts	Likely	Minor	Moderate/low
	Controlled waters Newyears Green Bourne within 50m	Lateral migration of contaminated groundwater, through culverts and surface run-off	Likely	Minor	Moderate/low
	Ecological Brackenbury Railway Cutting SINC (part of Area ref7-1)	Lateral migration of contaminated groundwater, through culverts and surface run-off	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
	Mid Colne Valley SINC adjacent	Contact with windblown dusts	Low likelihood	Minor	Low
	Property Adjacent to commercial/industrial facilities (agricultural research facility, skip hire, pre-mix cement manufacturer, construction material recycling centre)	Lateral migration and concentration of asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	Commercial/industrial facilities within 50m (oil depot)	Direct contact of below ground building structures and services with contaminated groundwater/soil	Unlikely	Negligible	Very low

Table 4: Baseline CSM and qualitative risk assessment – oil depot (Area ref 7-2)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Contaminants could include oils and fuels	Sensitive land use On-site employees	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Likely	Moderate	Moderate
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Sensitive land use Housing within 50m Adjacent employees (skip hire)	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Unlikely	Moderate	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
	facility)	Inhalation of vapours derived from contaminated groundwater/soil	No contaminant linkage	No contaminant linkage	None
		Exposure to asphyxiative or explosive gases	No contaminant linkage	No contaminant linkage	None
	Controlled waters Highly localised area of Secondary A Thames Valley Formation gravel aquifer on southern boundary (on high ground)	Vertical and lateral migration of contaminated groundwater	No contaminant linkage	No contaminant linkage	None
	Ecological Brackenbury Railway Cutting SINC adjacent	Lateral migration of contaminated groundwater and surface run-off	Unlikely	Minor	Very low
		Contact with windblown dusts	Low likelihood	Minor	Low
	Property On-site buildings	Concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Low likelihood	Minor	Low
	Property Housing within 50m Adjacent to commercial property (skip hire)	Lateral migration and concentration of asphyxiative or explosive gases	No contaminant linkage	No contaminant linkage	None
		Direct contact of below ground building structures and services with	Unlikely	Minor	Very low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
		contaminated groundwater/soil			

Table 5: Baseline CSM and qualitative risk assessment – historical infilled gravel pit (part of Dew's Dell SINC) (Area ref 7-7)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Assuming the site has been infilled with waste, contaminants that could be present include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos and ground gases (largely methane, carbon dioxide and VOC)	Sensitive land use On-site housing Adjacent housing	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Controlled waters Secondary A Lambeth Group aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Low likelihood	Minor	Low
	Ecological Dew's Dell SINC (on-site)	Lateral migration of contaminated groundwater and surface run-off	Likely	Minor	Moderate/low
		Contact with windblown dusts	Likely	Minor	Moderate/low
	Property On-site buildings Adjacent buildings	Concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures	Low likelihood	Negligible	Very low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
		and services with contaminated groundwater/soil			

Table 6: Baseline CSM and qualitative risk assessment – Denham Media Park and Broadwater Park Industrial Estate (Area ref 7-9)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Contaminants that could be present include, but are not limited to: fuels and oils, degreasants, paints, heavy metals, asbestos	Sensitive land use On-site employees Housing within 50m	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	Controlled waters Secondary A Taplow Gravels aquifer at surface across majority of this Area ref 7-9 Principal Chalk aquifer at surface in north-western corner	Vertical and lateral migration of contaminated groundwater	High likelihood	Severe	Very high
	Controlled waters Colne River within 50m	Lateral migration of contaminated groundwater and surface run-off	Low likelihood	Minor	Low
	Ecological	Lateral migration of contaminated groundwater	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
	Mid Colne Valley SSSI adjacent	and surface run-off			
	Mid Colne Valley SINC within 50m	Contact with windblown dusts	Unlikely	Minor	Very low
	Property On-site buildings	Concentration of asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	Housing and commercial facilities within 50m	Direct contact of below ground building structures and services with contaminated groundwater/soil	Low likelihood	Minor	Low

Table 7: Baseline CSM and qualitative risk assessment – former sewage works (Area ref 7-11)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Heavy metals, organic compounds e.g. oils, pathogens from sludge which may have been spreading on surrounding land. Also methane, carbon dioxide and VOC if sludge was buried	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater	Low likelihood	Severe	Moderate
	Controlled waters Colne River within 50m	Lateral migration of contaminated groundwater and surface run-off	Low likelihood	Minor	Low
	Ecological Mid Colne Valley SSSI adjacent	Lateral migration of contaminated groundwater and surface run-off	Low likelihood	Minor	Low
	Mid Colne Valley SINC within 50m	Contact with windblown dusts	Unlikely	Minor	Very low

Table 8: Baseline CSM and qualitative risk assessment – disused sand, gravel and chalk pit (Area ref 7-16)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Assuming the site has been infilled with waste, contaminants that could be present include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos and ground gases (largely methane, carbon dioxide and VOC)	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Unlikely	Severe	Moderate/low

Table 9: Baseline CSM and qualitative risk assessment – disused sand, gravel and chalk pit (Area ref 7-17)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Assuming the site has been infilled with waste, contaminants that could be present include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos and ground gases (largely methane, carbon dioxide and VOC)	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Unlikely	Severe	Moderate/low

Table 10: Baseline CSM and qualitative risk assessment – disused chalk pit and historical Pynesfield Farm Landfill (Area ref 7-18)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Chalk pit recorded as historical landfill (Pynesfield Farm) understood to have accepted inert and industrial waste</p> <p>Contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Controlled waters</p> <p>Principal Chalk aquifer at surface</p>	<p>Vertical and lateral migration of contaminated groundwater/leachate</p>	<p>Likely</p>	<p>Severe</p>	<p>High</p>

Table 11: Baseline CSM and qualitative risk assessment – disused chalk pits and historical landfill (Area ref 7-19)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Chalk pit recorded as historical landfill (Pynesfield Farm) understood to have accepted inert, industrial waste and special waste</p> <p>Contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Controlled waters</p> <p>Principal Chalk aquifer at surface</p>	<p>Vertical and lateral migration of contaminated groundwater/leachate</p>	<p>Likely</p>	<p>Severe</p>	<p>High</p>

Appendix LQ-001-007

Table 12: Baseline CSM and qualitative risk assessment – Pynesfield Farm/Maple Cross Landfill (Area ref 7-20)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Pynesfield Farm Landfill (historical) understood to have accepted inert, industrial and special waste</p> <p>Contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Controlled waters</p> <p>Principal Chalk and Secondary A Terrace Gravels aquifers at surface</p>	<p>Vertical and lateral migration of contaminated groundwater/leachate</p>	Likely	Severe	High

Table 13: Baseline CSM and qualitative risk assessment – West Hyde House Landfill (Area ref 7-26)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>West Hyde House Landfill (historical), wastes unrecorded. Currently a water body</p> <p>Contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Sensitive land use</p> <p>Housing within 50m</p> <p>Vehicle repair facilities within 50m</p>	Inhalation of vapours derived from contaminated groundwater/soil	Unlikely	Moderate	Low
		Exposure to asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	<p>Controlled waters</p> <p>Secondary A alluvium and Shepperton Gravel</p>	Vertical and lateral migration of contaminated groundwater/leachate	Low likelihood	Moderate	Moderate/low
	<p>Controlled waters</p> <p>Colne River within 50m</p>	Lateral migration of contaminated groundwater/leachate and	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
		surface run-off			
	Property Housing and vehicle repair facilities within 50m	Lateral migration and concentration of asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Unlikely	Negligible	Very low

Table 14: Baseline CSM and qualitative risk assessment – Dew's Farm historical landfill (Area ref 7-28)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Dew's Farm Landfill (historical), wastes unrecorded Contaminants that could be present include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos and ground gases (largely methane, carbon dioxide and VOC)	Sensitive land use Adjacent housing	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Controlled waters Secondary A Lambeth Group aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Likely	Minor	Moderate/low
	Ecological	Lateral migration of contaminated groundwater	Likely	Minor	Moderate/low

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
	Dew's Dell SINC (on-site)	and surface run-off			
		Contact with windblown dusts	Likely	Minor	Moderate/low
	Property Adjacent housing	Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater	Low likelihood	Negligible	Very low

Table 15: Baseline CSM and qualitative risk assessment – Harefield Marina Landfill (Area ref 7-31)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Harefield Marina landfill (historical) understood to have accepted inert, industrial, commercial and household waste. Now partly a water body</p> <p>Contaminants could include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Sensitive land use</p> <p>Housing within 50m</p> <p>Commercial premises within 50m (Widewater Place)</p>	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	<p>Controlled waters</p> <p>Secondary A superficial gravel deposits aquifer at surface</p>	Vertical and lateral migration of contaminated groundwater/leachate	Likely	Minor	Moderate/low
	<p>Ecological</p> <p>Mid Colne Valley SINC (on-site)</p>	Lateral migration of contaminated groundwater and surface run-off	Likely	Minor	Moderate/low
		Contact with windblown dusts	Low likelihood	Minor	Low
	<p>Property</p> <p>Buildings within 50m</p>	Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater	Low likelihood	Minor	Low

Appendix LQ-001-007

Table 16: Baseline CSM and qualitative risk assessment – Pynesfield Farm Landfill (Area ref 7-32)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Pynesfield Farm Landfill (historical), wastes unrecorded</p> <p>Contaminants could include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Controlled waters</p> <p>Principal Chalk aquifer at surface</p>	Vertical and lateral migration of contaminated groundwater/leachate	Likely	Severe	High

Table 17: Baseline CSM and qualitative risk assessment – New Years Green historical landfill (Area ref 7-33)

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>New Years Green (historical), commercial and household waste, last deposited in 1974</p> <p>Contaminants that could be present include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Sensitive land use</p> <p>On-site housing</p>	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	<p>Sensitive land use</p> <p>Adjacent housing</p>	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low

		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Controlled waters Secondary A Lambeth Group aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Likely	Minor	Moderate/low
	Ecological Dew's Dell SINC (off-site)	Lateral migration of contaminated groundwater and surface run-off	Low likelihood	Minor	Low
		Contact with windblown dusts	Low likelihood	Minor	Low
	Property On-site housing	Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater	Low likelihood	Negligible	Very low
	Property Adjacent housing	Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater	Low likelihood	Negligible	Very low

3.2 Construction risk assessment

Table 18: Construction CSM and qualitative risk assessment – existing Marylebone to Aylesbury line (Area ref 7-1)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Residual contamination in made ground (e.g. ballast) including heavy metals, oils and asbestos. Low levels of ground gas (methane, carbon dioxide and VOC) in areas of potential landfilling	Sensitive land use Adjacent to commercial/industrial facilities (agricultural research facility, skip hire, pre-mix cement manufacturer, construction material recycling centre) Commercial/industrial facilities within 50m (oil depot)	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Unlikely	Moderate	Low
		Inhalation of vapours derived from contaminated groundwater/soil	Unlikely	Moderate	Low
		Exposure to asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	Sensitive land use Agricultural research facility (adjacent)	None (on Proposed scheme, demolition proposed)	No contaminant linkage	No contaminant linkage	None
	Controlled waters Secondary A alluvium and Lambeth Group at surface	Vertical and lateral migration of contaminated groundwater and through culverts	Likely	Minor	Moderate/low
	Controlled waters Newyears Green Bourne within 50m	Lateral migration of contaminated groundwater, through culverts and surface run-off	Likely	Minor	Moderate/low
	Ecological Brackenbury Railway Cutting SINC	Lateral migration of contaminated groundwater, through	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
	(part of Area ref7-1)	culverts and surface run-off			
	Mid Colne Valley SINC adjacent	Contact with windblown dusts	Low likelihood	Minor	Low
	Property Agricultural research facility (adjacent)	None (on Proposed scheme, demolition proposed)	No contaminant linkage	No contaminant linkage	None
	Property Adjacent to commercial/industrial facilities (skip hire, pre-mix cement manufacturer, construction material recycling centre)	Lateral migration and concentration of asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	Commercial/industrial facilities within 50m (oil depot)	Direct contact of below ground building structures and services with contaminated groundwater/soil	Unlikely	Negligible	Very low

Table 19: Construction CSM and qualitative risk assessment – oil depot (Area ref 7-2)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Contaminants could include oils and fuels	Sensitive land use On-site employees	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Likely	Moderate	Moderate
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
	Sensitive land use Housing within 50m Adjacent employees (skip hire facility)	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Unlikely	Moderate	Low
		Inhalation of vapours derived from contaminated groundwater/soil	No contaminant linkage	No contaminant linkage	None
		Exposure to asphyxiative or explosive gases	No contaminant linkage	No contaminant linkage	None
	Controlled waters Highly localised area of Secondary A Thames Valley Formation gravel aquifer on southern boundary (on high ground)	Vertical and lateral migration of contaminated groundwater	No contaminant linkage	No contaminant linkage	None
	Ecological Brackenburg Railway Cutting SINC adjacent	Lateral migration of contaminated groundwater and surface run-off	Unlikely	Minor	Very low
		Contact with windblown dusts	Low likelihood	Minor	Low
	Property On-site buildings	Concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
	Property Housing within 50m Adjacent commercial property (skip hire)	Lateral migration and concentration of asphyxiative or explosive gases	No contaminant linkage	No contaminant linkage	None
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Unlikely	Minor	Very low

Table 20: Construction CSM and qualitative risk assessment – historical infilled gravel pit (part of Dew's Dell SINC) (Area ref 7-7)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Assuming the site has been infilled with waste, contaminants that could be present include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos and ground gases (largely methane, carbon dioxide and VOC)	Sensitive land use On-site housing	None (demolition assumed as buildings beneath proposed embankment)	No contaminant linkage	No contaminant linkage	None
	Sensitive land use Adjacent housing	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Controlled waters Secondary A Lambeth Group aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
	Ecological Dew's Dell SINC (on-site)	Lateral migration of contaminated groundwater and surface run-off	Likely	Minor	Moderate/low
		Contact with windblown dusts	Likely	Minor	Moderate/low
	Property On-site buildings	None (demolition assumed as buildings beneath proposed embankment)	No contaminant linkage	No contaminant linkage	None
	Property Adjacent buildings	Concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Low likelihood	Negligible	Very low

Table 21: Construction CSM and qualitative risk assessment – Denham Media Park and Broadwater Park Industrial Estate (Area ref 7-9)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Contaminants that could be present include, but are not limited to: fuels and oils, degreasants, paints, heavy metals, asbestos	Sensitive land use On-site employees Housing within 50m	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	Controlled waters Secondary A Taplow Gravels aquifer at surface across majority of this Area ref 7-9 Principal Chalk aquifer at surface in north-western corner	Vertical and lateral migration of contaminated groundwater	High likelihood	Severe	Very high
	Controlled waters Colne River within 50m	Lateral migration of contaminated groundwater and surface run-off	Low likelihood	Minor	Low
	Ecological Mid Colne Valley SSSI adjacent Mid Colne Valley SINC within 50m	Lateral migration of contaminated groundwater and surface run-off	Low likelihood	Minor	Low
		Contact with windblown dusts	Unlikely	Minor	Very low
	Property On-site buildings	Concentration of asphyxiative or explosive gases	Unlikely	Severe	Moderate/low

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
	Housing and commercial facilities within 50m	Direct contact of below ground building structures and services with contaminated groundwater/soil	Low likelihood	Minor	Low

Table 22: Construction CSM and qualitative risk assessment – former sewage works (Area ref 7-11)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Heavy metals, organic compounds e.g. oils, pathogens from sludge which may have been spreading on surrounding land. Also methane, carbon dioxide and VOC if sludge was buried	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater	Likely	Severe	High
	Controlled waters Colne River within 50m	Lateral migration of contaminated groundwater and surface run-off	Likely	Minor	Moderate/low
	Ecological Mid Colne Valley SSSI adjacent	Lateral migration of contaminated groundwater and surface run-off	Likely	Minor	Moderate/low
	Mid Colne Valley SINC within 50m	Contact with windblown dusts	Low likelihood	Minor	Low

Table 23: Construction CSM and qualitative risk assessment – disused sand, gravel and chalk pit (Area ref 7-16)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Assuming the site has been infilled with waste; contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Low likelihood	Severe	Moderate

Table 24: Construction CSM and qualitative risk assessment – disused sand, gravel and chalk pit (Area ref 7-17)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Assuming the site has been infilled with waste; contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Unlikely	Severe	Moderate/low

Table 25: Construction CSM and qualitative risk assessment – disused chalk pits and historical Pynesfield Farm Landfill (Area ref 7-18)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Chalk pit recorded as historical landfill (Pynesfield Farm) understood to have accepted inert and industrial waste	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Likely	Severe	High
Assuming the sites have been infilled with waste, contaminants that could be present include, but are not limited to: heavy metals, asbestos,					

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)					

Table 26: Construction CSM and qualitative risk assessment – disused chalk pits and historical landfill (Area ref 7-19)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Chalk pit recorded as landfill (Pynesfield Farm) understood to have accepted inert, industrial and special waste</p> <p>Assuming the sites have been infilled with waste, contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Controlled waters</p> <p>Principal Chalk aquifer at surface</p>	Vertical and lateral migration of contaminated groundwater/leachate	Likely	Severe	High

Table 27: Construction CSM and qualitative risk assessment – Pynesfield Farm/Maple Cross Landfill (Area ref 7-20)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Pynesfield Farm Landfill (historical) understood to have accepted inert, industrial and special waste</p> <p>Contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Controlled waters</p> <p>Principal Chalk and Secondary A Terrace Gravels aquifers at surface</p>	Vertical and lateral migration of contaminated groundwater/leachate	Likely	Severe	High

Table 28: Construction Baseline CSM and qualitative risk assessment – West Hyde House Landfill (Area ref 7-26)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>West Hyde House Landfill (status unknown) currently a water body</p> <p>Contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Sensitive land use</p> <p>Housing within 50m</p> <p>Vehicle repair facilities within 50m</p>	Inhalation of vapours derived from contaminated groundwater/soil	Unlikely	Moderate	Low
		Exposure to asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	<p>Controlled waters</p> <p>Secondary A alluvium and Shepperton Gravel</p>	Vertical and lateral migration of contaminated groundwater/leachate	Low likelihood	Moderate	Moderate/low
	<p>Controlled waters</p> <p>Colne River within 50m</p>	Lateral migration of contaminated groundwater/leachate and surface run-off	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
	Property Housing and vehicle repair facilities within 50m	Lateral migration and concentration of asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Unlikely	Negligible	Very low

Table 29: Construction CSM and qualitative risk assessment – Dew's Farm historical landfill (Area ref 7-28)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Dew's Farm Landfill (historical), wastes unrecorded Contaminants that could be present include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos and ground gases (largely methane, carbon dioxide and VOC)	Sensitive land use Adjacent housing	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Controlled waters Secondary A Lambeth Group aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Likely	Minor	Moderate/low
	Ecological Dew's Dell SINC (on-site)	Lateral migration of contaminated groundwater and surface run-off	Likely	Minor	Moderate/low

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
		Contact with windblown dusts	Likely	Minor	Moderate/low
	Property Adjacent housing	Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater	Low likelihood	Negligible	Very low

Table 30: Construction CSM and qualitative risk assessment – Harefield Marina Landfill (Area ref 7-31)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Harefield Marina landfill (historical) understood to have accepted inert, industrial, commercial and household waste. Now partly a water body</p> <p>Contaminants could include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Sensitive land use</p> <p>Housing within 50m</p> <p>Commercial premises within 50m (Widewater Place)</p>	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	<p>Controlled waters</p> <p>Secondary A superficial gravel deposits aquifer at surface</p>	Vertical and lateral migration of contaminated groundwater/leachate	Likely	Minor	Moderate/low
	<p>Ecological</p> <p>Mid Colne Valley SINC (on-site)</p>	Lateral migration of contaminated groundwater and surface run-off	Likely	Minor	Moderate/low
		Contact with windblown dusts	Low likelihood	Minor	Low
	<p>Property</p> <p>Buildings within 50m</p>	Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater	Low likelihood	Minor	Low

Table 31: Construction CSM and qualitative risk assessment – Pynesfield Farm Landfill (Area ref 7-32)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Pynesfield Farm Landfill (historical), wastes unrecorded</p> <p>Contaminants could include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Controlled waters</p> <p>Principal Chalk aquifer at surface</p>	Vertical and lateral migration of contaminated groundwater/leachate	Low likelihood	Severe	Moderate

Table 32: Construction CSM and qualitative risk assessment – New Years Green historical landfill (Area ref 7-33)

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>New Years Green (historical), commercial and household waste, last deposited in 1974</p> <p>Contaminants that could be present include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Sensitive land use</p> <p>On-site housing</p>	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	<p>Sensitive land use</p> <p>Adjacent housing</p>	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low

		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Controlled waters Secondary A Lambeth Group aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Likely	Minor	Moderate/low
	Ecological Dew's Dell SINC (off-site)	Lateral migration of contaminated groundwater and surface run-off	Low likelihood	Minor	Low
		Contact with windblown dusts	Low likelihood	Minor	Low
	Property On-site housing	Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater	Low likelihood	Negligible	Very low
	Property Adjacent housing	Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater	Low likelihood	Negligible	Very low

3.3 Post-construction risk assessment

Table 33: Post-Construction CSM and qualitative risk assessment – existing Marylebone to Aylesbury line (Area ref 7-1)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual contamination in made ground (e.g. ballast) including heavy metals, oils and asbestos. Low levels of ground gas (methane, carbon dioxide and VOC) in areas of potential landfilling	Sensitive land use	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Unlikely	Moderate	Low
	Adjacent to commercial/industrial facilities (skip hire, pre-mix cement manufacturer, construction material recycling centre)				
	Commercial/industrial facilities within 50m (oil depot)	Inhalation of vapours derived from contaminated groundwater/soil	Unlikely	Moderate	Low
		Exposure to asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	Sensitive land use	None (on Proposed scheme, demolition proposed)	No contaminant linkage	No contaminant linkage	None
	Agricultural research facility				
	Controlled waters	Vertical and lateral migration of contaminated groundwater	Likely	Minor	Moderate/low
	Secondary A alluvium and Lambeth Group at surface				
Controlled waters	Newyears Green Bourne within 50m	Lateral migration of contaminated groundwater and surface run-off	Likely	Minor	Moderate/low
	Ecological	Lateral migration of contaminated groundwater through culverts and surface run-off	Low likelihood	Minor	Low
	Brackenbury Railway Cutting SINC (part of Area ref7-1)				
Mid Colne Valley SINC adjacent		Contact with windblown	Low likelihood	Minor	Low

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
		dusts			
	Property Agricultural research facility (adjacent)	None (on Proposed scheme, demolition proposed)	No contaminant linkage	No contaminant linkage	None
	Property Adjacent to commercial/industrial facilities (skip hire, pre-mix cement manufacturer, construction material recycling centre)	Lateral migration and concentration of asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	Commercial/industrial facilities within 50m (oil depot)	Direct contact of below ground building structures and services with contaminated groundwater/soil	Unlikely	Negligible	Very low

Table 34: Post Construction CSM and qualitative risk assessment – oil depot (Area ref 7-2)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Contaminants could include oils and fuels	Sensitive land use On-site employees	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Likely	Moderate	Moderate
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Sensitive land use	Inhalation/ingestion of or dermal contact with	Unlikely	Moderate	Low

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
	Housing within 50m Adjacent employees (skip hire facility)	windblown contaminated soils/dust			
		Inhalation of vapours derived from contaminated groundwater/soil	No contaminant linkage	No contaminant linkage	None
		Exposure to asphyxiative or explosive gases	No contaminant linkage	No contaminant linkage	None
	Controlled waters Highly localised area of Secondary A Thames Valley Formation gravel aquifer on southern boundary (on high ground)	Vertical and lateral migration of contaminated groundwater	No contaminant linkage	No contaminant linkage	None
	Ecological Brackenbury Railway Cutting SINC adjacent	Lateral migration of contaminated groundwater and surface run-off	Unlikely	Minor	Very low
		Contact with windblown dusts	Low likelihood	Minor	Low
	Property On-site buildings	Concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Low likelihood	Minor	Low
	Property	Lateral migration and concentration of	No contaminant	No contaminant	None

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
	Housing within 50m	asphyxiative or explosive gases	linkage	linkage	
	Adjacent commercial property (skip hire)	Direct contact of below ground building structures and services with contaminated groundwater/soil	Unlikely	Minor	Very low

Table 35: Post Construction CSM and qualitative risk assessment – historical infilled gravel pit (part of Dew's Dell SINC) (Area ref 7-7)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Assuming the site has been infilled with waste, contaminants that could be present include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos and ground gases (largely methane, carbon dioxide and VOC)	Sensitive land use	None (demolition assumed as buildings beneath proposed embankment)	No contaminant linkage	No contaminant linkage	None
	On-site housing				
	Sensitive land use	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
	Adjacent housing	Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Controlled waters	Vertical and lateral migration of contaminated groundwater/leachate	Low likelihood	Minor	Low
	Secondary A Lambeth Group aquifer at surface				

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
	Ecological Dew's Dell SINC (on-site)	Lateral migration of contaminated groundwater and surface run-off	Likely	Minor	Moderate/low
		Contact with windblown dusts	Likely	Minor	Moderate/low
	Property On-site buildings	None (demolition assumed as buildings beneath proposed embankment)	No contaminant linkage	No contaminant linkage	None
	Property Adjacent buildings	Concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Low likelihood	Negligible	Very low

Table 36: Post Construction CSM and qualitative risk assessment – Denham Media Park and Broadwater Park Industrial Estate (Area ref 7-9)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Contaminants that could be present include, but are not limited to: fuels and oils, degreasants, paints, heavy metals, asbestos	Sensitive land use On-site employees Housing within 50m	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or	Unlikely	Severe	Moderate/low

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
		explosive gases			
	Controlled waters Secondary A Taplow Gravels aquifer at surface across majority of this Area ref 7-9 Principal Chalk aquifer at surface in north-western corner	Vertical and lateral migration of contaminated groundwater	High likelihood	Severe	Very high
	Controlled waters Colne River within 50m	Lateral migration of contaminated groundwater and surface run-off	Likely	Minor	Moderate/low
	Ecological Mid Colne Valley SSSI adjacent Mid Colne Valley SINCE within 50m	Lateral migration of contaminated groundwater and surface run-off	Likely	Minor	Moderate/low
		Contact with windblown dusts	Unlikely	Minor	Very low
	Property On-site buildings Housing and commercial facilities within 50m	Concentration of asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Low likelihood	Minor	Low

Table 37: Post Construction CSM and qualitative risk assessment – former sewage works (Area ref 7-11)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Heavy metals, organic compounds e.g. oils, pathogens from sludge which may have been spreading on surrounding land. Also methane, carbon dioxide and VOC if sludge was buried	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater	Low likelihood	Severe	Moderate
	Controlled waters Colne River within 50m	Lateral migration of contaminated groundwater and surface run-off	Likely	Minor	Moderate/low
	Ecological Mid Colne Valley SSSI adjacent Mid Colne Valley SINIC within 50m	Lateral migration of contaminated groundwater and surface run-off	Likely	Minor	Moderate/low
		Contact with windblown dusts	Unlikely	Minor	Very low

Table 38: Post Construction CSM and qualitative risk assessment – disused sand, gravel and chalk pit (Area ref 7-16)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Assuming the site has been infilled with waste; contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	No contaminant linkage	No contaminant linkage	None

Appendix LQ-001-007

Table 39: Post Construction CSM and qualitative risk assessment – disused sand, gravel and chalk pit (Area ref 7-17)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Assuming the site has been infilled with waste; contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Unlikely	Severe	Moderate/low

Table 40: Post Construction CSM and qualitative risk assessment – disused chalk pits and historical Pynesfield Farm Landfill (Area ref 7-18)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Chalk pit recorded as historical landfill (Pynesfield Farm) understood to have accepted inert and industrial waste Assuming the sites have been infilled with waste, contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)	Controlled waters Principal Chalk aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Low likelihood	Severe	Moderate

Table 41: Post Construction CSM and qualitative risk assessment – disused chalk pits and historical landfill (Area ref 7-19)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Chalk pit recorded as historical landfill understood to have accepted inert, industrial and special waste</p> <p>Assuming the sites have been infilled with waste, contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Controlled waters</p> <p>Principal Chalk aquifer at surface</p>	Vertical and lateral migration of contaminated groundwater/leachate	No contaminant linkage	No contaminant linkage	None

Table 42: Post Construction CSM and qualitative risk assessment – Pynesfield Farm/Maple Cross Landfill (Area ref 7-20)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Pynesfield Farm Landfill (historical) understood to have accepted inert, industrial and special waste</p> <p>Contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Controlled waters</p> <p>Principal Chalk and Secondary A Terrace Gravels aquifers at surface</p>	Vertical and lateral migration of contaminated groundwater/leachate	Low likelihood	Severe	Moderate

Appendix LQ-001-007

Table 43: Post Construction Baseline CSM and qualitative risk assessment – West Hyde House Landfill (Area ref 7-26)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>West Hyde House Landfill (status unknown) currently a water body</p> <p>Contaminants that could be present include, but are not limited to: heavy metals, asbestos, organic compounds e.g. oils, inorganic compounds such as ammoniacal nitrogen and chloride, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Sensitive land use</p> <p>Housing within 50m</p> <p>Vehicle repair facilities within 50m</p>	Inhalation of vapours derived from contaminated groundwater/soil	Unlikely	Moderate	Low
		Exposure to asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
	<p>Controlled waters</p> <p>Secondary A alluvium and Shepperton Gravel</p>	Vertical and lateral migration of contaminated groundwater/leachate	Low likelihood	Moderate	Moderate/low
	<p>Controlled waters</p> <p>Colne River within 50m</p>	Lateral migration of contaminated groundwater/leachate and surface run-off	Low likelihood	Minor	Low
	<p>Property</p> <p>Housing and vehicle repair facilities within 50m</p>	Lateral migration and concentration of asphyxiative or explosive gases	Unlikely	Severe	Moderate/low
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Unlikely	Negligible	Very low

Table 44: Post Construction CSM and qualitative risk assessment – Dew's Farm historical landfill (Area ref 7-28)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Dew's Farm Landfill (historical), wastes unrecorded Contaminants that could be present include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos and ground gases (largely methane, carbon dioxide and VOC)	Sensitive land use Adjacent housing	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Controlled waters Secondary A Lambeth Group aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Likely	Minor	Moderate/low
	Ecological Dew's Dell SINC (on-site)	Lateral migration of contaminated groundwater and surface run-off	Likely	Minor	Moderate/low
		Contact with windblown dusts	Likely	Minor	Moderate/low
	Property Adjacent housing	Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater	Low likelihood	Negligible	Very low

Table 45: Post Construction CSM and qualitative risk assessment – Harefield Marina Landfill (Area ref 7-31)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Contaminants could include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos, and ground gases (largely methane, carbon dioxide and VOC)	Sensitive land use Housing within 50m	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	No contaminant linkage	No contaminant linkage	None
		Inhalation of vapours derived from contaminated groundwater/soil	Unlikely	Moderate	Low
	Controlled waters Secondary A superficial deposits	Vertical and lateral migration of contaminated groundwater/leachate	Likely	Minor	Moderate/low
	Property Housing within 50m	Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater/soil	Unlikely	Minor	Low

Table 46: Post Construction CSM and qualitative risk assessment – Pynesfield Farm Landfill (Area ref 7-32)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>Pynesfield Farm Landfill (historical), wastes unrecorded</p> <p>Contaminants could include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos, and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Controlled waters</p> <p>Principal Chalk aquifer at surface</p>	Vertical and lateral migration of contaminated groundwater/leachate	Likely	Severe	High

Table 47: Post Construction CSM and qualitative risk assessment – New Years Green historical landfill (Area ref 7-33)

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
<p>New Years Green (historical), commercial and household waste, last deposited in 1974</p> <p>Contaminants that could be present include, but are not limited to: heavy metals, organic compounds e.g. oils, asbestos and ground gases (largely methane, carbon dioxide and VOC)</p>	<p>Sensitive land use</p> <p>On-site housing</p>	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low
		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	<p>Sensitive land use</p> <p>Adjacent housing</p>	Inhalation/ingestion of or dermal contact with windblown contaminated soils/dust	Low likelihood	Moderate	Moderate/low
		Inhalation of vapours derived from contaminated groundwater/soil	Low likelihood	Moderate	Moderate/low

		Exposure to asphyxiative or explosive gases	Low likelihood	Severe	Moderate
	Controlled waters Secondary A Lambeth Group aquifer at surface	Vertical and lateral migration of contaminated groundwater/leachate	Likely	Minor	Moderate/low
	Ecological Dew's Dell SINC (off-site)	Lateral migration of contaminated groundwater and surface run-off	Low likelihood	Minor	Low
		Contact with windblown dusts	Low likelihood	Minor	Low
	Property On-site housing	Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater	Low likelihood	Negligible	Very low
	Property Adjacent housing	Lateral migration and concentration of asphyxiative or explosive gases	Low likelihood	Severe	Moderate
		Direct contact of below ground building structures and services with contaminated groundwater	Low likelihood	Negligible	Very low

3.4 Assessment of temporary (construction) and permanent (post-construction) effects

Table 48: Significance of impact during construction and post construction – existing Marylebone to Aylesbury line (Area ref 7-1)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Inhalation/ingestion/dermal contact of contaminated soils/dusts by commercial premises employees within 50m	Low	Low	Low	Negligible	Negligible
Inhalation of vapours derived from contaminated groundwater/soil by commercial premises employees within 50m	Low	Low	Low	Negligible	Negligible
Exposure to asphyxiative or explosive gases by commercial premises employees within 50m	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Inhalation/ingestion/dermal contact of contaminated soils/dusts by agricultural research facility employees within 50m	Low	None	None	Moderate beneficial effect	Moderate beneficial effect
Inhalation of vapours derived from contaminated groundwater/soil by agricultural research facility employees within 50m	Low	None	None	Moderate beneficial effect	Moderate beneficial effect
Exposure to asphyxiative or explosive gases by agricultural research facility employees within 50m	Moderate/low	None	None	Moderate beneficial effect	Moderate beneficial effect
Vertical and lateral migration of contaminated groundwater into the Secondary A alluvium and Lambeth Group aquifers at surface	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Lateral migration of contaminated groundwater and surface run-off to Newyears Green Bourne	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Lateral migration of contaminated groundwater/leachate and surface run-off into Brackebury Railway Cutting SINC (partly on-site) and adjacent Mid Colne Valley SINC	Low	Low	Low	Negligible	Negligible
Contact with windblown dusts in Brackebury Railway	Low	Low	Low	Negligible	Negligible

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Cutting SINC (partly on-site) and adjacent Mid Colne Valley SINC					
Lateral migration and concentration of asphyxiative or explosive gases in adjacent agricultural research facility	Moderate/low	None	None	Moderate beneficial effect	Moderate beneficial effect
Direct contact of below ground building structures and services in adjacent agricultural research facility with contaminated groundwater/soil	Very low	None	None	Minor beneficial effect	Minor beneficial effect
Lateral migration and concentration of asphyxiative or explosive gases in commercial/industrial facilities within 50m	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Direct contact of below ground building structures and services within 50m with contaminated groundwater/soil	Very low	Very low	Very low	Negligible	Negligible
Overall significance				Negligible	Negligible

Table 49: Significance of impact during construction and post construction – oil depot (Area ref 7-2)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Inhalation/ingestion/dermal contact of contaminated soils/dusts by on-site oil depot employees	Moderate	Moderate	Moderate	Negligible	Negligible
Inhalation of vapours derived from contaminated groundwater/soil by on-site oil depot employees	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Exposure to asphyxiative or explosive gases by on-site oil depot employees	Moderate	Moderate	Moderate	Negligible	Negligible
Inhalation/ingestion/dermal contact of contaminated soils/dusts by residents and skip hire depot employees within 50m	Low	Low	Low	Negligible	Negligible
Inhalation of vapours derived from contaminated groundwater/soil by residents and skip hire depot	None	None	None	Negligible	Negligible

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
employees within 50m					
Exposure to asphyxiative or explosive gases by residents and skip hire depot employees within 50m	None	None	None	Negligible	Negligible
Vertical and lateral migration of contaminated groundwater into the Secondary A Thames Valley Formation gravel aquifer at surface (highly localised area on high ground within Area ref 7-2)	None	None	None	Negligible	Negligible
Lateral migration of contaminated groundwater/leachate and surface run-off into adjacent Brackenbury Railway Cutting SINC	Very low	Very low	Very low	Negligible	Negligible
Contact with windblown dusts in adjacent Brackenbury Railway Cutting SINC	Low	Low	Low	Negligible	Negligible
Concentration of asphyxiative or explosive gases in on-site buildings	Moderate	Moderate	Moderate	Negligible	Negligible
Direct contact of below ground building structures and services on-site with contaminated groundwater/soil	Low	Low	Low	Negligible	Negligible
Lateral migration and concentration of asphyxiative or explosive gases in buildings within 50m	None	None	None	Negligible	Negligible
Direct contact of below ground building structures and services within 50m with contaminated groundwater/soil	Very low	Very low	Very low	Negligible	Negligible
Overall significance				Negligible	Negligible

Table 50: Significance of impact during construction and post construction – historical infilled gravel pit (part of Dew's Dell SINC) (Area ref 7-7)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Inhalation/ingestion of or dermal contact with windblown contaminated soils/dusts by on-site residents	Moderate/low	None	None	Moderate beneficial effect	Moderate beneficial effect
Inhalation of vapours derived from contaminated groundwater/soil by on-site residents	Moderate/low	None	None	Moderate beneficial effect	Moderate beneficial effect
Exposure to asphyxiative or explosive gases by on-site residents	Moderate	None	None	Major beneficial effect	Major beneficial effect
Inhalation/ingestion of or dermal contact with windblown contaminated soils/dusts by on-site and adjacent residents	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Inhalation of vapours derived from contaminated groundwater/soil by on-site and adjacent residents	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Exposure to asphyxiative or explosive gases by on-site and adjacent residents	Moderate	Moderate	Moderate	Negligible	Negligible
Vertical and lateral migration of contaminated groundwater/leachate to Secondary A Lambeth Group aquifer at surface	Low	Low	Low	Negligible	Negligible
Lateral migration of contaminated groundwater and surface run-off to Dew's Dell SINC (on-site)	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Contact with windblown dusts to Dew's Dell SINC (on-site)	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Concentration of asphyxiative or explosive gases in on-site buildings	Moderate	None	None	Major beneficial effect	Major beneficial effect
Direct contact of on-site below ground building structures and services with contaminated groundwater/soil	Very low	None	None	Minor beneficial effect	Minor beneficial effect
Concentration of asphyxiative or explosive gases in adjacent buildings	Moderate	Moderate	Moderate	Negligible	Negligible

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Direct contact of adjacent below ground building structures and services with contaminated groundwater/soil	Very low	Very low	Very low	Negligible	Negligible
Overall significance				Negligible	Negligible

Table 51: Significance of impact during construction and post construction – Denham Media Park and Broadwater Park Industrial Estate (Area ref 7-9)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Inhalation/ingestion/dermal contact of contaminated soils/dusts by on-site employees and residents within 50m	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Inhalation of vapours derived from contaminated groundwater/soil by on-site employees and residents within 50m	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Exposure to asphyxiative or explosive gases by on-site employees and residents within 50m	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Vertical and lateral migration of contaminated groundwater to the Secondary A Taplow Gravels and Principal Chalk aquifers at surface	Very high	Very high	Very high	Negligible	Negligible
Lateral migration of contaminated groundwater and surface run-off to the Colne River	Low	Low	Moderate/low	Negligible	Minor adverse effect
Lateral migration of contaminated groundwater and surface run-off to adjacent Mid Colne Valley SSSI and Mid Colne Valley SINC within 50m	Low	Low	Moderate/low	Negligible	Minor adverse effect
Contact with windblown dusts in adjacent Mid Colne Valley SSSI and Mid Colne Valley SINC within 50m	Very low	Very low	Very low	Negligible	Negligible
Concentration of asphyxiative or explosive gases in on-site buildings and housing within 50m	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Direct contact of below ground building structures and services on-site and within 50m with contaminated	Low	Low	Low	Negligible	Negligible

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
groundwater/soil					
Overall significance				Negligible	Minor adverse effect

Table 52: Significance of impact during construction and post construction – former sewage works (Area ref 7-11)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Vertical and lateral migration of contaminated groundwater into the Principal Chalk aquifer at surface	Moderate	High	Moderate	Minor adverse effect	Negligible
Lateral migration of contaminated groundwater and surface run-off to Colne River	Low	Moderate/low	Moderate/low	Minor adverse effect	Minor adverse effect
Lateral migration of contaminated groundwater and surface run-off to adjacent Mid Colne Valley SSSI and Mid Colne Valley SINC within 50m	Low	Moderate/low	Moderate/low	Minor adverse effect	Minor adverse effect
Contact with windblown dusts in adjacent Mid Colne Valley SSSI and Mid Colne Valley SINC within 50m	Very Low	Low	Very Low	Minor adverse effect	Negligible
Overall significance				Minor adverse effect	Minor adverse effect

Table 53: Significance of impact during construction and post construction – disused sand, gravel and chalk pit (Area ref 7-16)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Vertical and lateral migration of contaminated groundwater/leachate into the Principal Chalk aquifer at surface	Moderate/low	Moderate	None	Minor adverse effect	Moderate beneficial effect
Overall significance				Minor adverse effect	Moderate beneficial effect

Table 54: Significance of impact during construction and post construction – disused sand, gravel and chalk pit (Area ref 7-17)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Vertical and lateral migration of contaminated groundwater/leachate into the Principal Chalk aquifer at surface	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Overall significance				Negligible	Negligible

Table 55: Significance of impact during construction and post construction – disused chalk pits and historical Pynesfield Farm Landfill (Area ref 7-18)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Vertical and lateral migration of contaminated groundwater/leachate into the Principal Chalk aquifer at surface	High	High	Moderate	Negligible	Minor beneficial effect
Overall significance				Negligible	Minor beneficial effect

Appendix LQ-001-007

Table 56: Significance of impact during construction and post construction – disused chalk pits and historical landfill (Area ref 7-19)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Vertical and lateral migration of contaminated groundwater/leachate into the Principal Chalk aquifer at surface	High	High	None	Negligible	Major beneficial effect
Overall significance				Negligible	Major beneficial effect

Table 57: Significance of impact during construction and post construction – Pynesfield Farm/Maple Cross Landfill (Area ref 7-20)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Vertical and lateral migration of contaminated groundwater/leachate into the Principal Chalk and Secondary A Terrace Gravels aquifers at surface	High	High	Moderate	Negligible	Minor beneficial effect
Overall significance				Negligible	Minor beneficial effect

Table 58: Significance of impact during construction and post construction – West Hyde House Landfill (Area ref 7-26)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Inhalation of vapours derived from contaminated groundwater/soil by residents and vehicle repair facilities employees within 50m	Low	Low	Low	Negligible	Negligible
Exposure to asphyxiative or explosive gases by residents and vehicle repair facilities employees within 50m	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Vertical and lateral migration of contaminated groundwater/leachate into the Secondary A alluvium and Shepperton Gravel aquifers at surface	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Lateral migration of contaminated groundwater/leachate and surface run-off to Colne River	Low	Low	Low	Negligible	Negligible
Lateral migration and concentration of asphyxiative or explosive gases in housing and vehicle repair facilities	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
within 50m					
Direct contact of below ground building structures and services within 50m with contaminated groundwater/soil	Very low	Very low	Very low	Negligible	Negligible
Overall significance				Negligible	Negligible

Table 59: Significance of impact during construction and post construction – Dew's Farm historical landfill (Area ref 7-28)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Inhalation/ingestion/dermal contact of contaminated soils/dusts by adjacent residents	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Inhalation of vapours derived from contaminated groundwater/soil by adjacent residents	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Exposure to asphyxiative or explosive gases by adjacent residents	Moderate	Moderate	Moderate	Negligible	Negligible
Vertical and lateral migration of contaminated groundwater/leachate to the Secondary A Lambeth Group aquifer at surface	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Lateral migration of contaminated groundwater and surface run-off to Dew's Dell SINC (on-site)	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Contact with windblown dusts to Dew's Dell SINC (on-site)	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Lateral migration and concentration of asphyxiative or explosive gases in adjacent housing	Moderate	Moderate	Moderate	Negligible	Negligible
Direct contact of adjacent below ground building structures and services with contaminated groundwater	Very low	Very low	Very low	Negligible	Negligible
Overall significance				Negligible	Negligible

Table 6o: Significance of impact during construction and post construction – Harefield Marina Landfill (Area ref 7-31)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Inhalation/ingestion/dermal contact of contaminated soils/dusts by residents and commercial premises employees within 50m	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Exposure to asphyxiative or explosive gases by residents and commercial premises employees within 50m	Moderate	Moderate	Moderate	Negligible	Negligible
Inhalation of vapours derived from contaminated groundwater/soil by residents and commercial premises employees within 50m	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Vertical and lateral migration of contaminated groundwater/leachate to the Secondary A superficial gravel deposits aquifer at surface	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Lateral migration of contaminated groundwater and surface run-off to Mid Colne Valley SINC (on-site)	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Contact with windblown dusts to Mid Colne Valley SINC (on-site)	Low	Low	Low	Negligible	Negligible
Lateral migration and concentration of asphyxiative or explosive gases in housing and commercial premises within 50m	Moderate	Moderate	Moderate	Negligible	Negligible
Direct contact of below ground building structures and services within 50m with contaminated groundwater/soil	Low	Low	Low	Negligible	Negligible
Overall significance				Negligible	Negligible

Table 61: Significance of impact during construction and post construction – Pynesfield Farm Landfill (Area ref 7-32)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Vertical and lateral migration of contaminated groundwater/leachate into the Principal Chalk aquifer at surface	High	Moderate	High	Minor beneficial effect	Negligible
Overall significance				Minor beneficial effect	Negligible

Table 62: Significance of impact during construction and post construction – New Years Green historical landfill (Area ref 7-33)

Contaminant linkage	Baseline risk	Construction risk	Post-construction risk	Construction effects	Post-construction effects
Inhalation/ingestion/dermal contact of contaminated soils/dusts by on-site residents	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Inhalation of vapours derived from contaminated groundwater/soil by on-site residents	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Exposure to asphyxiative or explosive gases by on-site residents	Moderate	Moderate	Moderate	Negligible	Negligible
Inhalation/ingestion/dermal contact of contaminated soils/dusts by adjacent residents	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Inhalation of vapours derived from contaminated groundwater/soil by adjacent residents	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Exposure to asphyxiative or explosive gases adjacent residents	Moderate	Moderate	Moderate	Negligible	Negligible
Vertical and lateral migration of contaminated groundwater/leachate to the Secondary A Lambeth Group aquifer at surface	Moderate/low	Moderate/low	Moderate/low	Negligible	Negligible
Lateral migration of contaminated groundwater and surface run-off to Dew's Dell SINC (off-site)	Low	Low	Low	Negligible	Negligible
Contact with windblown dusts to Dew's Dell SINC (off-site)	Low	Low	Low	Negligible	Negligible

Appendix LQ-001-007

Lateral migration and concentration of asphyxiative or explosive gases in on-site housing	Moderate	Moderate	Moderate	Negligible	Negligible
Direct contact of adjacent below ground building structures and services with contaminated groundwater	Very low	Very low	Very low	Negligible	Negligible
Lateral migration and concentration of asphyxiative or explosive gases in adjacent housing	Moderate	Moderate	Moderate	Negligible	Negligible
Direct contact of adjacent below ground building structures and services with contaminated groundwater	Very low	Very low	Very low	Negligible	Negligible
Overall significance				Negligible	Negligible

4 Inspections notes and other site data

- 4.1.1 There were no site visits carried out due to access constraints and no additional site data have been identified.

5 Geological sites of special scientific interest and local geological sites

5.1.1 There are no geo-conservation resources identified within the study area.

6 Mining and minerals data

- 6.1.1 Within the study area Denham Park Farm, located between the M25 and the Buckinghamshire/Hertfordshire County Boundary currently, has planning permission for the excavation of sand and gravel, and eventual backfilling, and has therefore been designated as a Preferred Mineral Site by BuCC. Details of the planning data are presented in Table 63.
- 6.1.2 The Buckinghamshire Minerals and Waste Core Strategy development plan document³, 2012 shows that the route passes through a minerals safeguarding area, which is presented in Maps LQ-01-10 to 013. The entire route section within the boundary of BuCC is within the mineral consultation area (MCA)/MSA designated by BuCC for sand and gravel resources.
- 6.1.3 Historical mapping shows four chalk pits located along the northern end of this study area which are also noted to have been quarried for sands and gravel. The Chalk in this area has also been identified by the British Geological Survey (BGS) as a mineral resource.
- 6.1.4 In the Hertfordshire part of the study area, the route passes through several MSA and MCA which are shown in the Maps LQ-01-011 to LQ-01-013 in Volume 5, Land Quality Map Book.

Table 63: Summary Mineral Planning within the Colne Valley area

Summary	
Reference	11/01260/CM
Alternative reference	Not available
Application received	11 August 2011
Address	Land At Denham Park Farm, Denham Green, Buckinghamshire, UB9 5DL
Proposal	Proposed extension of period within which permission SBD/8214/02 for progressive mineral extraction and infilling with inert material and restoration to agriculture can be implemented
Status	Application permitted
Appeal status	Not available
Appeal decision	Not available
Further information	
Application type	Full application
Decision	Application permitted
Actual decision level	Committee decision
Expected decision level	Not available
Parish	Denham Parish Council

³ Buckinghamshire County Council, (2011), *Minerals and Waste Core Strategy*, Adopted November 2012.

Summary	
Ward	Gerrards Cross and Denham North
District reference	Not available
Applicant name	Harleyford Aggregates Ltd
Environmental assessment requested	Yes
Important dates	
Application received date	11 August 2011
Application validated date	11 August 2011
Expiry date	10 October 2011
Actual committee date	24 January 2012
Latest neighbour consultation date	22 August 2011
Neighbour consultation expiry date	10 October 2011
Standard consultation date	27 December 2012
Standard consultation expiry date	23 September 2011
Last advertised In press date	Not available
Latest advertisement expiry date	26 September 2011
Last site notice posted date	25 August 2011
Latest site notice expiry date	15 September 2011
Decision made date	24 January 2012
Decision issued date	21 December 2012
Permission expiry date	21 December 2017
Decision printed date	Not available
Environmental impact assessment received	Not available
Target determination date	1 December 2011
Determination deadline	1 December 2011
Constraints	
There are no constraints associated with this case	

7 References

Buckinghamshire County Council, (2011), *Minerals and Waste Core Strategy*, Adopted November 2012.

Defra and Environment Agency, (2002), *Potential contaminants for the assessment of land - R&D Publication*, Bristol, Environment Agency.

Environmental Protection Act 1990, Part IIA, London, Her Majesty's Stationary Office.